Itasca State Park Related Research Conducted Under the Aegis of the College of Forestry, University of Minnesota: A Bibliography[1]

by

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PREFACE

This staff paper contains a list of reports, theses, and journal articles covering research carried out in Itasca State Park by the faculty and graduate students of the Department of Forest Resources, College of Forestry, University of Minnesota. In fact, some papers predate the organization of the College and were developed while it was the School of Forestry. One hundred and two papers are listed, with the earliest dated 1929. Not included here are many research papers by graduate students and faculty in the College of Biological Sciences and other units of the University of Minnesota, and visiting scientists.

It is hoped that this bibliography will enable students and researchers as well as park managers, naturalists and others to benefit from what has been learned through this long period of research and observation.

The following overview provides an insight into the major study areas. A brief description of each study area may be helpful.

The reference materials are available in the University of Minnesota Forestry Library.

OVERVIEW

Itasca State Park, located in northwestern Minnesota, encompasses an area of about 32,000 acres (13,000 ha). It includes stands of old-growth pine, a variety of other upland and lowland forests, and over 2,300 acres (950 ha) of lakes. The diversity of vegetation reflects the complex glacial history, the interaction of elements of mixed conifer-hardwood, deciduous and boreal forests, and the prairie, and past fire and logging disturbances. The park contains Lake Itasca, the source of the Mississippi River and records over a million visitor days of use every year.

The University of Minnesota's Lake Itasca Forestry and Biological Station is a unique feature of the park. It was established in 1909 for field instruction of forestry students. Since then it has been expanded to provide training and research for students in a wide range of biological disciplines. The park thus supports a variety of educational, research, and recreational activities.

Prior to 1940 the forestry program was largely instructional. After 1940, a strong research interest evolved. Major research efforts have been devoted to the following areas:

1. Fire, Logging and Vegetation History

Fire history was established based on fire scars, sedimentary charcoal analysis, stand-origin data, and written records for the most recent fire years. Maps were prepared showing the extent of major fires occurring since 1650.

Logging history was reconstructed by interviewing area residents, examining state, county, and local historical archives and government records, and conducting field studies.

The past and present forest vegetation was studied as related to fire and logging disturbances and, locally to pollen distribution patterns.

2. Research on Ecological Conditions

Stand composition and structure, emphasizing old-growth pine stands, were investigated over the range of upland forest conditions.

Vegetation-environment relationships were examined and ecological gradients evaluated in terms of moisture, nutrients, heat and light.

Tree regeneration has been surveyed and intensively studied for many years. The scarcity of pine regeneration was related to such limiting factors as dense shrub undergrowth, deer browse, inadequate seed supply, frequent drought periods, lack of fire disturbances and white pine blister rust.

The variation in Corylus populations within and among five forest types and changes in population structure over a 19-year period were investigated.

The nature and extent of wind damage was examined using salvage and survey records and by carrying out field studies after blowdowns.

Pattern and intensity of deer and rabbit browsing on woody plants, especially pine, were investigated. Porcupine feeding habits were examined and deer hunting schedules discussed.

Successional trends in upland forest ecosystems were evaluated based on community composition and structure, tree longevity, species ecological characteristics, and soil conditions. Successional changes over a 19-year period were studied based on permanent plot data collected from 29 communities representing the range of upland forest conditions in the park.

3. Forest Classification and Mapping

Vegetation cover type maps were prepared based on aerial photos and ground surveys. More recently, a classification of forest vegetation was completed using landsat multispectral scanner and thematic mapper data. The Itasca Park forest was also used to collect and analyze high-resolution spectral data of forest canopies.

Local ecological forest types were worked out for upland forests using data on stand and soil characteristics.

4. Vegetation Management

Vegetation management plans based on zones of different levels of visitor use have been evaluated and proposed with an objective to maintain and restore presettlement communities and to meet recreational needs. Since 1969 several treatments have been underway on a pilot scale to test pine regeneration possibilities. Different silvicultural measures have been applied including prescribed burning, overstory removal, shrub control, seeding and planting.

Effects of prescribed burning and logging disturbance on forest and aquatic ecosystems were examined.

5. Recreational Use and Visitor Preferences

Surveys have been made of vegetational preferences of park users, their attitudes toward vegetation management, reactions to vista clearings, preference to campgrounds, camper reactions to fees and charges, and other attitudes and perceptions on park use and management.

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